

X(3872) $I^G(J^{PC}) = 0^+(1^{++})$

First observed by CHOI 03 in $B \rightarrow K\pi^+\pi^- J/\psi(1S)$ decays as a narrow peak in the invariant mass distribution of the $\pi^+\pi^- J/\psi(1S)$ final state. Isovector hypothesis excluded by AUBERT 05B and CHOI 11.

AAIJ 13Q perform a full five-dimensional amplitude analysis of the angular correlations between the decay products in $B^+ \rightarrow X(3872)K^+$ decays, where $X(3872) \rightarrow J/\psi\pi^+\pi^-$ and $J/\psi \rightarrow \mu^+\mu^-$, which unambiguously gives the $J^{PC} = 1^{++}$ assignment.

See our note on "Developments in Heavy Quarkonium Spectroscopy".

X(3872) MASS FROM $J/\psi X$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3871.68 ± 0.17 OUR AVERAGE				
3871.95 ± 0.48 ± 0.12	0.6k	AAIJ	12H	LHCb $p\bar{p} \rightarrow J/\psi\pi^+\pi^-X$
3871.85 ± 0.27 ± 0.19	~ 170	¹ CHOI	11	BELL $B \rightarrow K\pi^+\pi^-J/\psi$
3873 ± 1.8 ± 1.3	27 ± 8	² DEL-AMO-SA.10B	BABR	$B \rightarrow \omega J/\psi K$
3871.61 ± 0.16 ± 0.19	6k	^{2,3} AALTONEN	09AU CDF2	$p\bar{p} \rightarrow J/\psi\pi^+\pi^-X$
3871.4 ± 0.6 ± 0.1	93.4	AUBERT	08Y BABR	$B^+ \rightarrow K^+ J/\psi\pi^+\pi^-$
3868.7 ± 1.5 ± 0.4	9.4	AUBERT	08Y BABR	$B^0 \rightarrow K_S^0 J/\psi\pi^+\pi^-$
3871.8 ± 3.1 ± 3.0	522	^{2,4} ABAZOV	04F D0	$p\bar{p} \rightarrow J/\psi\pi^+\pi^-X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3868.6 ± 1.2 ± 0.2	8	⁵ AUBERT	06	BABR $B^0 \rightarrow K_S^0 J/\psi\pi^+\pi^-$
3871.3 ± 0.6 ± 0.1	61	⁵ AUBERT	06	BABR $B^- \rightarrow K^- J/\psi\pi^+\pi^-$
3873.4 ± 1.4	25	⁶ AUBERT	05R BABR	$B^+ \rightarrow K^+ J/\psi\pi^+\pi^-$
3871.3 ± 0.7 ± 0.4	730	^{2,7} ACOSTA	04	CDF2 $p\bar{p} \rightarrow J/\psi\pi^+\pi^-X$
3872.0 ± 0.6 ± 0.5	36	⁸ CHOI	03	BELL $B \rightarrow K\pi^+\pi^-J/\psi$
3836 ± 13	58	^{2,9} ANTONIAZZI	94 E705	$300 \pi^\pm Li \rightarrow J/\psi\pi^+\pi^-X$

¹ The mass difference for the $X(3872)$ produced in B^+ and B^0 decays is $(-0.71 \pm 0.96 \pm 0.19)$ MeV.

² Width consistent with detector resolution.

³ A possible equal mixture of two states with a mass difference greater than $3.6 \text{ MeV}/c^2$ is excluded at 95% CL.

⁴ Calculated from the corresponding $m_{X(3872)} - m_{J/\psi}$ using $m_{J/\psi} = 3096.916 \text{ MeV}$.

⁵ Calculated from the corresponding $m_{X(3872)} - m_{\psi(2S)}$ using $m_{\psi(2S)} = 3686.093 \text{ MeV}$. Superseded by AUBERT 08Y.

⁶ Calculated from the corresponding $m_{X(3872)} - m_{\psi(2S)}$ using $m_{\psi(2S)} = 3685.96 \text{ MeV}$. Superseded by AUBERT 06.

⁷ Superseded by AALTONEN 09AU.

⁸ Superseded by CHOI 11.

⁹ A lower mass value can be due to an incorrect momentum scale for soft pions.

X(3872) MASS FROM $\bar{D}^{*0} D^0$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3872.9 $^{+0.6}_{-0.4}$ $^{+0.4}_{-0.5}$	50 ^{10,11} AUSHEV	10	BELL	$B \rightarrow \bar{D}^{*0} D^0 K$
3875.1 $^{+0.7}_{-0.5}$ $^{+0.5}_{-0.5}$	33 ± 6 ¹¹ AUBERT	08B BABR	$B \rightarrow \bar{D}^{*0} D^0 K$	
3875.2 ± 0.7 $^{+0.9}_{-1.8}$	24 ± 6 ^{11,12} GOKHROO	06	BELL	$B \rightarrow D^0 \bar{D}^0 \pi^0 K$

¹⁰ Calculated from the measured $m_{X(3872)} - m_{D^{*0}} - m_{\bar{D}^0} = 1.1 $^{+0.6}_{-0.4}$ $^{+0.1}_{-0.3}$ MeV$.

¹¹ Experiments report $D^{*0}\bar{D}^0$ invariant mass above $D^{*0}\bar{D}^0$ threshold because D^{*0} decay products are kinematically constrained to the D^{*0} mass, even though the D^{*0} may decay off-shell.

¹² Superseded by AUSHEV 10.

NODE=M176

NODE=M176

NODE=M176M

NODE=M176M

OCCUR=2

OCCUR=2

NODE=M176M;LINKAGE=CO

NODE=M176M;LINKAGE=AC

NODE=M176M;LINKAGE=AA

NODE=M176M;LINKAGE=AB

NODE=M176M;LINKAGE=AE

NODE=M176M;LINKAGE=AU

NODE=M176M;LINKAGE=AT

NODE=M176M;LINKAGE=CH

NODE=M176M;LINKAGE=AN

NODE=M176MD0

NODE=M176MD0

NODE=M176MD0;LINKAGE=AS

NODE=M176MD0;LINKAGE=AU

NODE=M176MD0;LINKAGE=GO

$m_{X(3872)} - m_{J/\psi}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
774.9±3.1±3.0	522	ABAZOV	04F D0	$p\bar{p} \rightarrow J/\psi\pi^+\pi^- X$

 $m_{X(3872)} - m_{\psi(2S)}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
187.4±1.4	25	13 AUBERT	05R BABR	$B^+ \rightarrow K^+ J/\psi\pi^+\pi^-$
13 Superseded by AUBERT 06.				

 $X(3872)$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<1.2	90		CHOI	11 BELL	$B \rightarrow K\pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.3	90		AUBERT	08Y BABR	$B^+ \rightarrow K^+ J/\psi\pi^+\pi^-$
<4.1	90	69	AUBERT	06 BABR	$B \rightarrow K\pi^+\pi^- J/\psi$
<2.3	90	36	14 CHOI	03 BELL	$B \rightarrow K\pi^+\pi^- J/\psi$

14 Superseded by CHOI 11.

 $X(3872)$ WIDTH FROM $\bar{D}^{*0}D^0$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.9 ^{+2.8+0.2} _{-1.4-1.1}	50	15 AUSHEV	10 BELL	$B \rightarrow \bar{D}^{*0}D^0 K$
3.0 ^{+1.9} _{-1.4} ±0.9	33 ± 6	AUBERT	08B BABR	$B \rightarrow \bar{D}^{*0}D^0 K$

15 With a measured value of $B(B \rightarrow X(3872)K) \times B(X(3872) \rightarrow D^{*0}\bar{D}^0) = (0.80 \pm 0.20 \pm 0.10) \times 10^{-4}$, assumed to be equal for both charged and neutral modes. **$X(3872)$ DECAY MODES**

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 e^+ e^-$	
$\Gamma_2 \pi^+\pi^- J/\psi(1S)$	> 2.6 %
$\Gamma_3 \rho^0 J/\psi(1S)$	
$\Gamma_4 \omega J/\psi(1S)$	> 1.9 %
$\Gamma_5 D^0 \bar{D}^0 \pi^0$	> 32 %
$\Gamma_6 \bar{D}^{*0} D^0$	> 24 %
$\Gamma_7 \gamma\gamma$	
$\Gamma_8 D^0 \bar{D}^0$	
$\Gamma_9 D^+ D^-$	
$\Gamma_{10} \gamma\chi_{c1}$	
$\Gamma_{11} \eta J/\psi$	
$\Gamma_{12} \gamma J/\psi$	> 6 × 10 ⁻³
$\Gamma_{13} \gamma\psi(2S)$	[a] > 3.0 %
$\Gamma_{14} \pi^+\pi^-\eta_c(1S)$	not seen

[a] BHARDWAJ 11 does not observe this decay and presents a stronger 90% CL limit than this value. See measurements listings for details.

 $X(3872)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$	Γ_1
VALUE (keV)	DOCUMENT ID
• • • We do not use the following data for averages, fits, limits, etc. • • •	
<0.28	90 16 YUAN 04 RVUE
16 Using BAI 98E data on $e^+e^- \rightarrow \pi^+\pi^-\ell^+\ell^-$. Assuming that $\Gamma(\pi^+\pi^- J/\psi)$ of $X(3872)$ is the same as that of $\psi(2S)$ (85.4 keV).	

NODE=M176207

NODE=M176DM

NODE=M176DM2

NODE=M176DM2

NODE=M176DM2;LINKAGE=AU

NODE=M176W

NODE=M176W

NODE=M176W;LINKAGE=CH

NODE=M176WD0

NODE=M176WD0

NODE=M176WD0;LINKAGE=AU

NODE=M176215;NODE=M176

DESIG=1

DESIG=2

DESIG=10

DESIG=13

DESIG=8

DESIG=12

DESIG=5

DESIG=6

DESIG=7

DESIG=3

DESIG=4

DESIG=9

DESIG=11

DESIG=14;OUR EVAL;→ UNCHECKED ←

LINKAGE=BBL

NODE=M176220

NODE=M176W1

NODE=M176W1

NODE=M176W1;LINKAGE=A

X(3872) $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\pi^+\pi^- J/\psi(1S)) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_2\Gamma_1/\Gamma$			
VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
< 6.2	90	17,18 AUBERT	05D BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 8.3	90	18 DOBBS	05 CLE3	$e^+e^- \rightarrow \pi^+\pi^-J/\psi$
< 10	90	19 YUAN	04 RVUE	$e^+e^- \rightarrow \pi^+\pi^-J/\psi$
17 Using $B(X(3872) \rightarrow J/\psi\pi^+\pi^-) \cdot B(J/\psi \rightarrow \mu^+\mu^-) \cdot \Gamma(X(3872) \rightarrow e^+e^-) < 0.37$ eV from AUBERT 05D and $B(J/\psi \rightarrow \mu^+\mu^-) = 0.0588 \pm 0.0010$ from the PDG 04.				
18 Assuming $X(3872)$ has $JPC = 1--$.				
19 Using BAI 98E data on $e^+e^- \rightarrow \pi^+\pi^-\ell^+\ell^-$. From theoretical calculation of the production cross section and using $B(J/\psi \rightarrow \mu^+\mu^-) = (5.88 \pm 0.10)\%$.				

X(3872) $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\pi^+\pi^- J/\psi(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_2\Gamma_7/\Gamma$			
VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 12.9	90	20 DOBBS	05 CLE3	$e^+e^- \rightarrow \pi^+\pi^-J/\psi\gamma$
20 Assuming $X(3872)$ has positive C parity and spin 0.				

$\Gamma(\omega J/\psi(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_4\Gamma_7/\Gamma$			
VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 1.7	90	21 LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
21 Assuming $X(3872)$ has spin 2.				

$\Gamma(\pi^+\pi^-\eta_c(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_{14}\Gamma_7/\Gamma$			
VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
< 11.1	90	LEES	12AE BABR	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\eta_c$

X(3872) BRANCHING RATIOS

$\Gamma(\pi^+\pi^- J/\psi(1S))/\Gamma_{\text{total}}$	Γ_2/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
>0.026				
>0.026	93 ± 17	22 AUBERT	08Y BABR	$B \rightarrow X(3872)K$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
>0.04	30	23 AUBERT	05R BABR	$B^+ \rightarrow K^+J/\psi\pi^+\pi^-$
>0.04	36 ± 7	24 CHOI	03 BABR	$B^+ \rightarrow K^+J/\psi\pi^+\pi^-$
22 AUBERT 08Y	reports $[\Gamma(X(3872) \rightarrow \pi^+\pi^-J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (8.4 \pm 1.5 \pm 0.7) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$.			
23 Superseded by AUBERT 08Y. AUBERT 05R reports $[\Gamma(X(3872) \rightarrow \pi^+\pi^-J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (1.28 \pm 0.41) \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$.				
24 CHOI 03 reports $[\Gamma(X(3872) \rightarrow \pi^+\pi^-J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] / [B(B^+ \rightarrow \psi(2S)K^+)] / [B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)] = 0.063 \pm 0.012 \pm 0.007$ which we multiply or divide by our best values $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$, $B(B^+ \rightarrow \psi(2S)K^+) = (6.27 \pm 0.24) \times 10^{-4}$, $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (34.0 \pm 0.4) \times 10^{-2}$.				

$\Gamma(\omega J/\psi(1S))/\Gamma_{\text{total}}$	Γ_4/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
>0.019				
>0.019	21 ± 7	25 DEL-AMO-SA..10B	BABR	$B^+ \rightarrow \omega J/\psi K^+$
25 DEL-AMO-SANCHEZ 10B	reports $[\Gamma(X(3872) \rightarrow \omega J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (6 \pm 2 \pm 1) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$. DEL-AMO-SANCHEZ 10B also reports $B(B^0 \rightarrow X(3872)K^0) \times B(X(3872) \rightarrow J/\psi\omega) = (6 \pm 3 \pm 1) \times 10^{-6}$.			

NODE=M176230

NODE=M176G1

NODE=M176G1

NODE=M176G1;LINKAGE=AU

NODE=M176G1;LINKAGE=DO

NODE=M176G1;LINKAGE=A

NODE=M176232

NODE=M176H1

NODE=M176H1

NODE=M176H1;LINKAGE=DO

NODE=M176G01

NODE=M176G01

NODE=M176G01;LINKAGE=LE

NODE=M176G02

NODE=M176G02

NODE=M176235

NODE=M176R6

NODE=M176R6

NODE=M176R6;LINKAGE=AB

NODE=M176R6;LINKAGE=AE

NODE=M176R6;LINKAGE=CH

NODE=M176R14

NODE=M176R14

NODE=M176R14;LINKAGE=DE

$\Gamma(\omega J/\psi(1S))/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_4/Γ_2		
VALUE	DOCUMENT ID	TECN	COMMENT
0.8±0.3	26 DEL-AMO-SA..10B	BABR	$B \rightarrow \omega J/\psi K$

26 Statistical and systematic errors added in quadrature. Uses the values of $B(B \rightarrow X(3872)K) \times B(X(3872) \rightarrow J/\psi \pi^+ \pi^-)$ reported in AUBERT 08Y, taking into account the common systematics.

$\Gamma(D^0 \bar{D}^0 \pi^0)/\Gamma_{\text{total}}$	Γ_5/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
>0.32 [$>3.2 \times 10^{-3}$ OUR 2012 BEST LIMIT]				

>0.32 17 ± 5 27 GOKHROO 06 BELL $B^+ \rightarrow D^0 \bar{D}^0 \pi^0 K^+$
 27 GOKHROO 06 reports $[\Gamma(X(3872) \rightarrow D^0 \bar{D}^0 \pi^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (1.02 \pm 0.31 \pm 0.21) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$.

$\Gamma(\bar{D}^{*0} D^0)/\Gamma_{\text{total}}$	Γ_6/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
>0.24 [$>5 \times 10^{-3}$ OUR 2012 BEST LIMIT]				

>0.24 41^{+9}_{-8} 28 AUSHEV 10 BELL $B^+ \rightarrow \bar{D}^{*0} D^0 K^+$
 • • • We do not use the following data for averages, fits, limits, etc. • • •
 >0.5 27 ± 6 29 AUBERT 08B BABR $B^+ \rightarrow \bar{D}^{*0} D^0 K^+$
 28 AUSHEV 10 reports $[\Gamma(X(3872) \rightarrow \bar{D}^{*0} D^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (0.77 \pm 0.16 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$.
 29 AUBERT 08B reports $[\Gamma(X(3872) \rightarrow \bar{D}^{*0} D^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872)K^+)] = (1.67 \pm 0.36 \pm 0.47) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow X(3872)K^+) < 3.2 \times 10^{-4}$.

$\Gamma(D^0 \bar{D}^0 \pi^0)/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_5/Γ_2		
VALUE	DOCUMENT ID	TECN	COMMENT
seen	30 GOKHROO 06 BELL	$B \rightarrow D^0 \bar{D}^0 \pi^0 K$	

• • • We do not use the following data for averages, fits, limits, etc. • • •
 seen AUSHEV 10 BELL $B \rightarrow D^0 \bar{D}^0 \pi^0 K$
 30 May not necessarily be the same state as that observed in the $J/\psi \pi^+ \pi^-$ mode. Supersedes CHISTOV 04.

$\Gamma(D^0 \bar{D}^0)/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_8/Γ_2		
VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			

not seen CHISTOV 04 BELL $B \rightarrow K D^0 \bar{D}^0$

$\Gamma(D^+ D^-)/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_9/Γ_2		
VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			

not seen CHISTOV 04 BELL $B \rightarrow K D^+ D^-$

$\Gamma(\gamma \chi_{c1})/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_{10}/Γ_2			
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.89	90	CHOI 03	BELL	$B \rightarrow K \pi^+ \pi^- J/\psi$

$\Gamma(\eta J/\psi)/\Gamma(\pi^+ \pi^- J/\psi(1S))$	Γ_{11}/Γ_2			
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				

<0.6 90 AUBERT 04Y BABR $B \rightarrow K \eta J/\psi$

$\Gamma(\gamma J/\psi)/\Gamma_{\text{total}}$	Γ_{12}/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
>6 $\times 10^{-3}$	31 BHARDWAJ 11	BELL	$B^\pm \rightarrow \gamma J/\psi K^\pm$	

• • • We do not use the following data for averages, fits, limits, etc. • • •
 >9 $\times 10^{-3}$ 20 32 AUBERT 09B BABR $B^+ \rightarrow \gamma J/\psi K^+$
 >0.010 19 33 AUBERT,BE 06M BABR $B^+ \rightarrow \gamma J/\psi K^+$

NODE=M176R15
 NODE=M176R15

NODE=M176R15;LINKAGE=DE

NODE=M176R12
 NODE=M176R12

NODE=M176R12;LINKAGE=GO

NODE=M176R13
 NODE=M176R13

NODE=M176R13;LINKAGE=AS

NODE=M176R13;LINKAGE=AU

NODE=M176R5
 NODE=M176R5

NODE=M176R5;LINKAGE=GO

NODE=M176R3
 NODE=M176R3

NODE=M176R4
 NODE=M176R4

NODE=M176R1
 NODE=M176R1

NODE=M176R2
 NODE=M176R2

NODE=M176R7
 NODE=M176R7

- 31 BHARDWAJ 11 reports $[\Gamma(X(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872) K^+)] = (1.78^{+0.48}_{-0.44} \pm 0.12) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872) K^+) < 3.2 \times 10^{-4}$.
- 32 AUBERT 09B reports $[\Gamma(X(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872) K^+)] = (2.8 \pm 0.8 \pm 0.1) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872) K^+) < 3.2 \times 10^{-4}$.
- 33 Superseded by AUBERT 09B. AUBERT,BE 06M reports $[\Gamma(X(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872) K^+)] = (3.3 \pm 1.0 \pm 0.3) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872) K^+) < 3.2 \times 10^{-4}$.

NODE=M176R7;LINKAGE=BA

NODE=M176R7;LINKAGE=AB

NODE=M176R7;LINKAGE=AU

 $\Gamma(\gamma\psi(2S))/\Gamma_{\text{total}}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{13}/Γ
not seen		34 BHARDWAJ	11 BELL	$B^+ \rightarrow \gamma\psi(2S)K^+$	
>0.030	25 ± 7	35 AUBERT	09B BABR	$B^+ \rightarrow \gamma\psi(2S)K^+$	
34 BHARDWAJ 11 reports $B(B^+ \rightarrow K^+ X(3872)) \times B(X \rightarrow \gamma\psi(2S)) < 3.45 \times 10^{-6}$ at 90% CL.					NODE=M176R10;LINKAGE=BH
35 AUBERT 09B reports $[\Gamma(X(3872) \rightarrow \gamma\psi(2S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow X(3872) K^+)] = (9.5 \pm 2.7 \pm 0.6) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow X(3872) K^+) < 3.2 \times 10^{-4}$.					NODE=M176R10;LINKAGE=AU

 $\Gamma(\gamma\psi(2S))/\Gamma(\gamma J/\psi)$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{13}/Γ_{12}
<2.1	90	BHARDWAJ	11 BELL	$B^+ \rightarrow K^+\psi(2S)\gamma$	
3.4±1.4		AUBERT	09B BABR	$B^+ \rightarrow \gamma c\bar{c}K'$	

X(3872) REFERENCES

AAIJ	13Q	PRL 110 222001	R. Aaij <i>et al.</i>	(LHCb Collab.) JP	REFID=54985
AAIJ	12H	EPJ C72 1972	R. Aaij <i>et al.</i>	(LHCb Collab.)	REFID=54056
LEES	12AD	PR D86 072002	J.P. Lees <i>et al.</i>	(BABAR Collab.)	REFID=54751
LEES	12AE	PR D86 092005	J.P. Lees <i>et al.</i>	(BABAR Collab.)	REFID=54752
BHARDWAJ	11	PRL 107 091803	V. Bhardwaj <i>et al.</i>	(BELLE Collab.)	REFID=53779
CHOI	11	PR D84 052004	S.-K. Choi <i>et al.</i>	(BELLE Collab.)	REFID=53934
AUSHEV	10	PR D81 031103	T. Aushev <i>et al.</i>	(BELLE Collab.)	REFID=53225
DEL-AMO-SA...	10B	PR D82 011101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)	REFID=53362
AALTONEN	09AU	PRD 103 152001	T. Aaltonen <i>et al.</i>	(CDF Collab.)	REFID=53098
AUBERT	09B	PRL 102 132001	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52722
AUBERT	08B	PR D77 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52120
AUBERT	08Y	PR D77 111101	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=52265
AUBERT	06	PR D73 011101	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51017
AUBERT,BE	06M	PR D74 071101	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=51454
GOKHROO	06	PRL 97 162002	G. Gokhroo <i>et al.</i>	(BELLE Collab.)	REFID=51432
AUBERT	05B	PR D71 031501	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=50498
AUBERT	05D	PR D71 052001	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=50509
AUBERT	05R	PR D71 071103	B. Aubert <i>et al.</i>	(BABAR Collab.)	REFID=50627
DOBBS	05	PRL 94 032004	S. Dobbs <i>et al.</i>	(CLEO Collab.)	REFID=50458
ABAZOV	04F	PRL 93 162002	V.M. Abazov <i>et al.</i>	(D0 Collab.)	REFID=50200
ACOSTA	04	PRD 93 072001	D. Acosta <i>et al.</i>	(CDF Collab.)	REFID=49742
AUBERT	04Y	PRL 93 041801	B. Aubert <i>et al.</i>	(BaBar Collab.)	REFID=49997
CHISTOV	04	PRL 93 051803	R. Chistov <i>et al.</i>	(BELLE Collab.)	REFID=50002
PDG	04	PL B592 1	S. Eidelman <i>et al.</i>	(PDG Collab.)	REFID=49653
YUAN	04	PL B579 74	C.Z. Yuan <i>et al.</i>		REFID=49677
CHOI	03	PRL 91 262001	S.-K. Choi <i>et al.</i>	(BELLE Collab.)	REFID=49628
BAI	98E	PR D57 3854	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=46339
ANTONIAZZI	94	PR D50 4258	L. Antoniazzi <i>et al.</i>	(E705 Collab.)	REFID=44074

NODE=M176